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10th Part of AAEE/868.

SECURITY INFORMATION

MINISTRY OF SUPPLY

AEROPLANE AND ARMAMENT EXPERIMENTAL ESTABLISHMENT

BOSCOMBE DOWN

VENOM FB.1. WE.258
(GHOST 3)

4 X 20 MM. MK.5[E] HISPANO GUNS
GUNNERY ACCEPTANCE TRIALS

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10th Part of Report No. AAEE/868

AEROPLANE AND ARMAMENT EXPERIMENTAL ESTABLISHMENT
BOSCOMBE DOWN

30. JAN. 1953

Venom FB.1. WE.258
(Ghost 3)

4 x 20 mm. Mk. 5* Hispano Guns
Gunnery Acceptance Trials

A. & A.E.E. Ref.: AAEE/5903/42.
M.O.S. Ref.: 7/Armts/2027/O.683.
Period of Trial: 7th March, 1952 to 12th August, 1952.

Progress of issue of Report

Report No.	Title	
5th Part of AAEE/868	VV.613	Flight at high Mach numbers without wing tip tanks.
6th - do -	VV.613	Cockpit Appraisal.
7th - do -	VV.613	Qualitative handling trials, including flight at high mach numbers, without tip tanks.
8th - do -	VV.613	Qualitative handling trials with 2 x 80 gallon wing tip tanks.
9th - do -	WE.255	Brief check handling tests after incorporating minor modifications.

Summary

Gunnery Acceptance trials have been completed on the Venom Fighter Bomber Mk.1 Aircraft (D.H.112) in accordance with M.O.S. letter and trials pro-forma 7/Armt/2027/O.683 dated 31st May, 1951.

A total of 117 sorties were flown with three aircraft during which 55,899 rounds were fired. The guns were fired at speeds up to the limiting speed of the aircraft, under 'g' conditions and in full combat manoeuvres, and at high altitude.

During the trial a considerable number of sorties were flown to determine the best configuration of link deflector having regard to the necessity for keeping the links clear of the fuselage with the minimum effect on the performance of the aircraft.

Concurrently with the rest of the trial the causes of damage to blast tubes on other Vampire/Venom aircraft were investigated and a satisfactory blast tube evolved.

It is the opinion of this Establishment that the gunnery installation of the Venom F.B.1. aircraft (D.H.112) is acceptable for Service use provided that the modifications recommended are incorporated.

This report is issued with the authority of

Air Commodore,
Commanding, A. & A.E.E.

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/Introduction....

1. Introduction

Gunnery acceptance trials have been completed on Venom Fighter Bomber Mk.1 aircraft WE.255, WE.258 and WE.259 in accordance with M.O.S. letter and trials pro-forma 7/Armt/2027/O.683 dated 31st May, 1951.

The trial was carried out on WE.255 from 16th July 1951 to 29th August 1951 and on WE.258 and WE.259, from 7th March 1952 to 12th August, 1952.

2. Description of Installation

The installation is similar to that of the Vampire 1 aircraft, which is described in the 6th part of Report No. AAEE/819,a.

3. Method of Trial

3.1. Initial Examination

3.1.1. The installation was checked and the guns removed and replaced by a proven set of guns.

3.2. Ground Functioning

3.2.1. Approximately 1950 rounds were fired during ground functioning trials on WE.255 and 475 rounds on WE.258.

3.3. Air Functioning

3.3.1. Twenty three air firing sorties were flown on WE.255 during which the guns were fired at speeds up to the limiting speed of the aircraft under 'g' conditions and in full combat manoeuvres, and at high altitude.

3.3.2. Sixty-two air firing sorties were flown on WE.258 under similar conditions to those stated in para. 3.3.1. above.

3.3.3. A total of 11,114 rds. was fired in the air with WE.255 and 28,019 rds. with WE.258.

3.3.4. During Intensive Flying Trials on WE.259 thirty-two air firing sorties were flown, the majority being at high speed at low level during which 16,766 rds. were fired.

3.3.5. The total number of air firing sorties flown during the trial was 117, during which 55,899 rds were fired.

4. Results of Trial

4.1. Initial Examination

4.1.1. No difficulty was found in removing and installing the guns, although the position of the gun heater pipes makes it advisable to adjust the inboard magazine carrier tie-rods before installing the outboard guns.

4.2. Ground Functioning

4.2.1. Approximately 1950 rds. were fired during ground functioning trials with WE.255 and 475 rds. with WE.258. No signs of blast damage were revealed.

4.2.2. The range of gun adjustment was checked and found to be approximately 0° 32' in all directions from the centre line of the gun mounting.

4.2.3. When the guns are adjusted to maximum combination of elevation and 'toe-in' all four cannon spouts are liable to be hit if the guns are fired.

/4.2.4...

4.2.4. The guns and sight were harmonised without difficulty and the view over the nose was measured. With the head in the normal sighting position the downward view through the sight is 4° 42', and alongside the sight 10° 25'.

4.3. Air Functioning WE.255

4.3.1. Twenty-three air firing sorties were carried out with WE.255 during which 11,114 rds. were fired. Details of sorties and rounds fired are at Appendix 1.

4.3.2. Air firing was carried out during these sorties at speeds ranging from 250 knots to 535 knots, the limiting speed of the aircraft, under 'g' conditions and in full combat manoeuvres. At 45,000 ft. the guns were fired at speeds up to I.M.N. 0.855 (limit 0.86).

4.3.3. As a result of the high stoppage rate, especially cases of the cartridge cap being lightly struck, the guns were removed for testing. Similar stoppages were experienced during butt tests.

4.3.4. The aircraft was returned to the makers for investigation of handling characteristics.

4.4. Air Functioning WE.258

4.4.1. Sixty-two air firing sorties were carried out with WE.258, during which 28,019 rds. were fired. Details of sorties, rounds fired and stoppages are at appendix 2.

4.4.2. No stoppages occurred which were attributable to the installation with the exception of those during the first air firing sortie. These four stoppages were caused by the original link deflectors which have been rejected.

4.4.3. Air firing was carried out at speeds ranging from 450 knots to 535 knots, under 'g' conditions and in full combat manoeuvres and at 40,000 ft. at speeds up to I.M.N. 0.835 which was the maximum at which this aircraft was a stable gun platform.

4.4.4. At speeds of 450 knots and over there were a considerable number of link strikes under the fuselage. Trials were carried out with a number of different deflectors to eliminate these strikes without affecting the performance of the aircraft. This part of the trial is dealt with fully in para. 4.7.

4.4.5. After the 36th sortie (rounds fired 16,383) the port cannon spout fairing was found to be cracked at the cut-away portions giving clearance for the rear nose-wheel door hinges. All four cannon spouts were cracked at the fairing (see Figs. 2, 3, 4 and 5). The panels were repaired and refitted. There was no recurrence of this failure.

4.4.6. One sortie was flown at 40,000 ft. during which the guns were fired at I.M.N. 0.82, 0.83 and 0.835. Firing had no effect apparent on the handling of the aircraft at these speeds (See Appendix 4).

4.4.7. Four sorties were flown at 40,000 ft. during which the guns were fired after 45 to 50 mins. at that height. The ambient temperatures were in the region of -56° C at height during these sorties.

4.4.8. After the 34th sortie it was found that the quick release assembly at the rear mounting (Stores Ref: 26FC/4028) was fractured (Fig. 9). Two other quick release assemblies were changed due to the slide tubes becoming slack in the brackets.

/4.4.9...

4.4.9. During the 62nd sortie the return spring guide and rod of the starboard outer gun failed and were partially ejected through the back block of the gun. They came to rest alongside the starboard accumulator bearing on a nut on the accumulator tray about 2½" from the rear bulkhead of the gun bay (see fig. 11). This failure should be compared with that mentioned in para. 4.5.8. and fig.10.

4.4.10. Five cases occurred on WE.258 and four on WE.259 of failure of maxiflux leads causing stoppages. In two cases the lead short-circuited in the plug causing a fuse and stopping two guns. In the remaining cases a failure, usually in the plug stopped a single gun. The fault appears to be in the rather flimsy nature of the contacts in the plug and in the fact that the plug is very difficult to grip and withdraw especially with oily fingers. The result of this is that there is a tendency for the cable to be accidently pulled when the hand slips. A plug having stronger contacts and a partial flange at the rear to form a grip is considered desireable.

4.4.11. Rate of fire tests were carried out during low and high level sorties, and detailed results, together with a brief history of the guns employed, are given at Appendix 6.

It should be noted that, at this Establishment, all 20 m.m. guns must pass an acceptance test on a ground mounting, using both Mk.5 and Mk.7 B.F.M.'s before they are classified as suitable for installation in an aircraft.

4.5. Intensive Gunnery Trials - WE.259.

4.5.1. As part of the intensive flying trials (which will be covered by a separate part of this report, in preparation) 32 air firing sorties were carried out with WE.259 (See appendix 3 for details of sorties). A total of 16,766 rounds was fired during these sorties.

4.5.2. Twenty five sorties were flown at 2,000 ft. I.A.S. 480 kts. to 510 knots, with the exception of sortie No. 4 when the guns were fired at 450 knots I.A.S.

4.5.3. Five sorties were made against ground targets when firing normally took place at 400 knots although three attacks were made at 450 and 500 knots.

4.5.4. Two sorties were flown at 40,000 ft. when the guns were fired at I.M.N. 0.81 to 0.84.

4.5.5. It was necessary to change the port and starboard cannon spout fairings after the 18th and 27th sorties respectively owing to cracks in the fairings.

4.5.6. On five occasions cannon spouts cracked at the fairing in the manner shown in Fig. 5. These were repaired by welding and there were no cases of the cracks re-appearing. It should be noted in this connection that it was necessary to change the fairing after a maximum of a further eleven sorties after welding for other reasons, see also para. 4.4.5.

4.5.7. After the 5th sortie it was found that the packing strip along the upper edge of the cannon spout fairing on each side of the aircraft had been forced out as shown in Fig. 6. This is thought to be caused by gas escaping during longitudinal movement of the blast tubes, forcing its way out of the forward gun bays. The packing strip was repaired and no further trouble was experienced. However it should be noted that modified blast tubes were fitted on the port side after the 7th sortie and on the starboard side after the 12th sortie. A similar failure occurred on WE.258 when using standard blast tubes.

/4.5.8....

4.5.8. After the 7th and 12th sorties it was found that the front cone of a blast tube (standard pattern) was damaged due to hammering against the cannon spout.

4.5.9. After the 12th sortie it was found that the pin retaining the return spring guide and the head of the return spring guide rod had fractured on the starboard inner gun allowing both these parts to move back and protrude through the back block of the gun. Due to burrs they stopped 5/16" short of a main fuel pipe at the base of the fuselage tank (see Fig. 10) While the incidence of this failure is very low it constitutes a serious hazard to the aircraft especially as the guide and rod can be ejected considerably further than in this instance and so fracture the fuel pipe. The position of the port inner gun to fuel pipes is similar to that of the starboard inner gun.

4.6. Blast tubes

4.6.1. Owing to damage which occurred on other aircraft of the Vampire/Venom type, trials were carried out on blast tubes concurrently with the gunnery trials.

4.6.2. A modified blast tube was evolved by the Martin Baker Aircraft Co. which was found to be satisfactory. Approximately 50 firing sorties were carried out with this type mostly at speeds of 500 knots and over. Fig. 7 shows the original and modified types. The maker's drawing No. of the modified type is MBT60/5350.

4.6.3. A detailed report on this trial is made in AAEE/Report No. Arm. 115.

4.6.4. The present method of securing the blast tubes to the front mountings of the guns is not considered strong enough. In two cases the jubilee clips fractured across the cut-away portion giving clearance for the outer eccentric lock. It is considered that a clip similar to that shown in fig. 8 should be introduced. This clip is re-inforced at its narrowest part and is secured by a nut and bolt.

4.7. Link Deflectors

4.7.1. As a result of numerous link strikes on the underside of the fuselage and of strikes on the booms and tailplane of other Vampire and Venom aircraft at speeds of 450 knots I.A.S. and over, link deflectors were fitted to WE.258 by the makers. (See fig. 12). On WE.255 links had entered the air scoops under the fuselage at speeds as low as 350 knots (See appendix 1 Sorties 1 - 3).

4.7.2. These deflectors proved unsatisfactory as the links piled up in the deflectors and link chutes and stopped the guns. (See appendix 2, Sortie 1).

4.7.3. Extensive trials were then carried out to determine the best configuration of link deflector having regard to the need for keeping the links clear of the fuselage with the minimum effect on the performance of the aircraft. Forty air firing sorties were flown during these trials.

4.7.4. A link deflector consisting of an extension link chute fitted to the gun access door and an external deflector was found to be satisfactory. The extension chute fits over the end of the link chute from the B.F.M. and is belled out at the inner end to allow for movement of the link chute during harmonisation and gun changes. The deflector is of approximately streamlined section and has a maximum depth of $2\frac{1}{2}$". Fig. 17 shows the deflector and fig. 18, the extension link chute. The aircraft's performance at high mach number is not affected by these deflectors. (See appendix 4).

4.7.5. Although the link deflector in its final form eliminates practically all link strikes, the underside of the fuselage, the booms and the tailplane must be checked for damage after each air firing sortie.

/4.7.6..

4.7.6. Details of the various deflectors tested are given in appendix 7 and figs. 13 to 18 inclusive. Films of the link flow at 500 kts. IAS were taken with a cine camera mounted on the port pylon. Specimen prints from these are shown in figs. 19 to 23.

4.8. Re-arming.

4.8.1. A crew of four men re-armed the aircraft in 12 mins. from the time the aircraft stopped in the dispersal. Ammunition and loaded B.F.M.'s were ready at the dispersal.

4.8.2. A more experienced crew of four men re-armed the aircraft in 15 mins. In this case the ammunition was ready at the dispersal but the B.F.M.'s off the aircraft were re-loaded in a workshop 75 yds. away and re-fitted on the aircraft.

4.8.3. The magazines of the G.45 camera and the G.G.S. recorder were changed in these times.

4.9. Harmonisation

4.9.3. A harmonisation diagram has been produced for the conditions laid down by Air Ministry (appendix 5.) Accuracy trials were carried out with the guns and sights harmonised to this diagram at P.E.E. Pendine and it was found to be satisfactory.

4.10. Gun and Ammunition Bay Temperature Trials

4.10.1. These are fully reported in the 12th Part of this Report, which is summarised as follows:-

4.10.2. "The temperatures of the gun bodies and ammunition tanks in Venom FB. Mk.1. WE.255, were measured in flight under the most severe probable conditions. The results showed that the gun body and ammunition tanks temperatures would be too low under the coldest and too high under the hottest conditions required by AP.970. Covering and uncovering the gun muzzles had a negligible effect on the temperatures.

5. Conclusions

5.1. The gunnery installation of the Venom FB.1 aircraft (DH.112) is acceptable for Service use provided that the modification detailed in para. 6.1. below is incorporated retrospectively, and that consideration be given to the remaining modifications listed in para. 6.

6. Recommendations

6.1. Link deflectors of the type shown in the De Havilland Aircraft Company's drawing "D.H.112 Link Chute Extensions "drawing No. 12Z.2345 but with the 2½" fairings produced by that firm, must be fitted as standard. The underside of the fuselage, the booms and tailplane must be checked for damage after each air firing sortie.

6.2. Blast tubes of the modified MBT/60 pattern with the Edge Type Rim to the Martin Baker Aircraft Company's drawing No. MBT/60/M5350 should be fitted as standard. Until this is done blast tubes should be checked for damage after each air firing sortie.

6.3. A stronger method of securing the rear end of the blast tube to the front mounting eccentric should be introduced. A reinforced clip similar to that shown in fig. 8 is considered suitable.

6.4. Owing to the possibility of hitting the cannon spouts, firing should not take place until the guns and sights have been harmonised to an approved diagram. This is considered to be an undesirable feature and a modification is recommended to clear the guns through the full range of adjustment.

/6.5.....

6.5. The possibility of moving the fuel pipes from behind the axes of the inner guns or of protecting the pipes from the results of a further failure of the type mentioned in paras. 4.4.7. and 4.5.8. should be considered.

6.6. A re-designed plug for the Maxiflux unit, see para. 4.4.10, is considered desireable.

6.7. To avoid the danger of the guns freezing at high altitude and of the ammunition deteriorating at low altitude, the heat supply to the guns should be increased and some form of automatic control should be introduced into the system to shut off the heat when not required.

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Appendix 1

Full Gunnery Acceptance Trials
Venom FB.1 - WE.255 - Air Firing Records

Date	Sortie No.	Flight Data	Gun Pos'n.	Rounds Fired	No. of stoppages	Stoppages	Progressive Rds. fired.	Total stoppages.	Remarks
19.7.51.	1	2000 ft. I.A.S. 250 kts.	PO	150			432	2	Air scoops struck
			PI	87	1	Light strike			
			SO	45	1	Light strike			
			SI	150					
19.7.51	2	2000 ft. I.A.S. 350 kts.	PO	127	1	Light strike	914	4	Air scoops struck
			PI	55	1	Light strike			
			SO	150					
			SI	150					
20.7.51	3	3000 ft. I.A.S. 400 kts.	PO	150			1494	5	Air scoops struck, one link found in engine bay.
			PI	150					
			SO	150					
			SI	130	1	Link jam			
20.7.51.	4	3000 ft. I.A.S. 450 kts.	PO	150			2062	6	Air scoops struck 1 link in starboard scoop.
			PI	150					
			SO	150					
			SI	118	1	Link jam			
20.7.51	5	3000 ft. I.A.S. 475 kts.	PO	150			2632	7	Air scopp struck - 1 link in engine bay.
			PI	150					
			SO	150					
			SI	120	1	Light strike			
8.8.51	6	2000 ft. I.A.S. 450 kts.	PO	150			3232	7	
			PI	150					
			SO	150					
			SI	150					
9.8.51	7	2000 ft. I.A.S. 475 kts.	PO	150			3832	7	
			PI	150					
			SO	150					
			SI	150					
9.8.51	8	2000 ft. I.A.S. 500 kts.	PO	150			4432	7	
			PI	150					
			SO	150					
			SI	150					
9.8.51	9	1500 ft. I.A.S. 520 kts.	PO	150			5032	7	
			PI	150					
			SO	150					
			SI	150					

10.8.51	10	I.A.S. 400 kts. 'G' Conditions	PO	150		Light Strike	5508	8	
			PI	26	1				
			SO	150					
			SI	150					
10.8.51	11	I.A.S. 400 kts. 'G' Conditions	PO	150			6108	8	
			PI	150					
			SO	150					
			SI	150					
10.8.51	12	I.A.S. 400 kts. 'G' Conditions.	PO	150			6708	8	
			PI	150					
			SO	150					
			SI	150					
10.8.51	13	Full combat manoeuvres.	PO	150		Belt caught in tank lid. Broken extractor	7175	10	
			PI	117	1				
			SO	50	1				
			SI	150					
21.8.51	14	2000 ft. I.A.S. 535 kts.	PO	150		Short recoil	7628	11	
			PI	150					
			SO	3	1				
			SI	150					
21.8.51	15	2000 ft. I.A.S. 535 kts.	PO	150		Short recoil	8080	12	
			PI	150					
			SO	2	1				
			SI	150					
22.8.51	16	2000 ft. I.A.S. 535 kts.	PO	71	1	Light strike Maxiflux lead u/s Misfeed	8360	15	
			PI	57	1				
			SO	2	1				
			SI	150					
22.8.51	17	Full combat manoeuvres	PO	-	1	Light strike	8662	17	
			PI	150					
			SO	2	1	Misfeed			
			SI	150					
23.8.51	18	45,000 ft. I.M.N. 0.845	PO	150			9123	18	
			PI	150					
			SO	150					
			SI	11	1	Misfeed			
23.8.51	19	45,000 ft.	PO	150		Maxiflux u/s	9547	20	
			PI	123	1				
			SO	150					
			SI	1	1	Misfeed			

23.8.51	20	Full combat manoeuvres	PO	150			10147	20	
			PI	150					
			SO	150					
			SI	150					
23.8.51	21	Full combat manoeuvres	PO	17	1	Light strike	10488	22	
			PI	150					
			SO	150					
			SI	24	1				
27.8.51	22	45,000 ft. I.M.N. 0.85	PO	1	1		10750	25	
			PI	150					
			SO	5	1				
			SI	106	1	Light strike			
29.8.51	23	45,000 ft. I.M.N. 0.855	PO	62	1	Link jam in B.F.M.	11114	27	
			PI	150					
			SO	150					
			SI	2	1.	Short recoil.			

Full Gunnery Acceptance Trials
Venom FB.1 - WE.258 - Air Firing Records

Appendix 2

Date	Sortie No.	Flight Data	Gun No.	Gun Pos'n.	Rounds Fired	No. of stoppages	Stoppages	Progressive Rds. fired	Total stoppages	Remarks
27.3.52	1	1300 ft. I.A.S. 450 kts.	H.10673	PO	62	1	P.O. S.I. Link jam in deflectors	137	4	D.H. deflectors removed after this sortie.
			L.7220	PI	18	1	P.1. S.O. Complete misfeed,			
			H.10505	SO	15	1	suspect temporary jam in link chutes.			
			H.10710	SI	42	1				
27.3.52	2	1300 ft. I.A.S. 450 kts.	do	PO	150			737	4	Strikes under fuselage. Air scoops cut.
				PI	150					
				SO	150					
				SI	150					
27.3.52	3	1000 ft. I.A.S. 500 kts.	do	PO	150			1337	4	Strikes under fuselage and 2 on port boom. Air scoops badly cut.
				PI	150					
				SO	150					
				SI	150					
3.4.52	4	1000 ft. I.A.S. 435 kts.	H.11657	PO	150			1797	5	Scoops cut, strikes under fuselage.
			3363	PI	150					
			J.4506	SO	150					
			H.11786	SI	10	1	Misfeed.			
3.4.52	5	1000 ft. I.A.S. 500 kts.	do	PO	150			2262	6	As for sortie No.4.
				PI	150					
				SO	150					
				SI	15	1	Misfeed. B.F.M. changed.			
4.4.52	6	1000 ft. I.A.S. 535 - 510 kts.	do	PO	16		Link jam in B.F.M. Spring on link chute door re-set.	2583	8	As for sortie No.4.
				PI	150					
				SO	150					
				SI	5	1	Misfeed. Gun changed (short recoil)			
4.4.52	7	1000 ft. I.A.S. 535 - 515 kts.	do L.7220	PO	150			3183	8	As for sortie No.4.
				PI	150					
				SO	150					
				SI	150					
4.4.52	8	1000 ft. I.A.S. 535 - 515 kts.	do	PO	150			3783	8	As for sortie No.4.
				PI	150					
				SO	150					
				SI	150					
9.4.52	9	1500 ft. I.A.S. 460 kts.	H.10673	PO	150			4383	8	Local made deflectors fitted. No strikes.
			L.7220	PI	150					
			H.10505	SO	150					
			H.10710	SI	150					

9.4.52.	10	1500 ft. I.A.S. 500 kts.	H.10673 L.7220 H.10505 H.10710	PO PI SO SI	150 150 150 150			4983	8	5 strikes.
15.4.52.	11	1500 ft. I.A.S. 500 kts.	do	PO PI SO SI	150 150 150 150			5583	8	7 strikes
16.4.52	12	1500 ft. -1.2 to +4.8 G.	do	PO PI SO SI	20 150 150 150	1	Maxiflux lead failed	6053	9	2 strikes
16.4.52	13	1500 ft. +0.5 to + 3G	do	PO PI SO SI	150 150 150 100	 1	Maxiflux lead failed. No fault found.	6603	10	9 strikes
17.4.52	14	Full combat manoeuvres.	H.11765 J.6462 J.7636 H.10898	PO PI SO SI	150 150 150 Nil	 1	Partial short in maxiflux load. Changed Lead.	7053	11	10 strikes
17.4.52	15	Full combat manoeuvres	do	PO PI SO SI	10 150 150 150	1	Faulty ejection.	7513	12	3 strikes
17.4.52	16	Full combat manoeuvres.	do	PO PI SO SI	150 150 150 150			8113	12	11 strikes
18.4.52	17	2000 ft. I.A.S. 520 - 530 knots.	do	PO PI SO SI	150 150 150 150			8713	12	4 strikes
18.4.52	18	2000 ft. I.A.S. 520 - 530 knots	do	PO PI SO SI	116 150 150 150	1	Link jam in B.F.M.	9279	13	12 strikes
22.4.52	19	2000 ft. I.A.S. 500 kts.	H.10673 L.7220 H.10505 H.10710	PO PI SO SI	150 150 150 150			9879	13	Modified D.H. Deflectors fitted. 42 strikes.

23.4.52	20	2000 ft. I.A.S. 500 kts.	H.10673 L.7220 H.10505 H.10710	PO PI SO SI	150 150 150 150			10479	13	Re-modified D.H. Deflectors fitted. 21 strikes.
20.5.52	21	Air to ground	do	PO PI SO SI	150 150 150 150			11079	13	
21.5.52	22	Accuracy trials	do	PO PI SO SI	48 48 49 44			11268	13	
21.5.52	23	Accuracy trial.	do	PO PI SO SI	45 42 35 32			11422	13	
22.5.52	24	Accuracy trial.	do	PO PI SO SI	54 - 60 60	1	Maxiflux u/s.	11596	14	
22.5.52	25	Accuracy trial.	do	PO PI SO SI	50 40 40 50			11776	14	
22.5.52	26	Accuracy trial.	do	PO PI SO SI	12 10 11 11			11820	14	
23.5.52	27	Accuracy trial.	do	PO PI SO SI	50 42 50 50			12012	14	
23.5.52	28	Accuracy trial.	do.	PO PI SO SI.	48 56 55 60			12231	14	
28.5.52	29	2000 ft. I.A.S. 500 kts.	do.	PO PI SO SI	150 150 150 150			12831	14	New type DH. Deflectors fitted $4\frac{1}{2}$" fairings. No. strikes.

4.6.52	30	2000 ft. I.A.S. 500 kts.	L.7220 H.10710 H.10505 H.10673	PO. PI SO SI	150 150 150 26	 1	Misfeed	13307	15	1 strike.
4.6.52	31	2000 ft. I.A.S. 530 - 535 kts.	do	PO PI SO SI	150 150 30 15	 1 1	Link jams in B.F.M.s.	13652	17	No strikes.
4.6.52	32	2000 ft. I.A.S. 530 kts.	do	PO PI SO SI	101 150 150 150	1 	Broken firing pin.	14203	18	No strikes.
9.6.52	33	2000 ft. -0.5 to +4G	do	PO PI SO SI	150 150 150 150	 		14803	18	No strikes.
11.6.52	34	Full combat manoeuvres.	H.11786 3363 H.4506 H.11657	PO PI SO SI	150 150 25 150	 1 	Link jam in B.F.M., B.F.M. u/s and charged.	15278	19	P.1. Quick release assembly in rear mounting broken. No. strikes.
12.6.52	35	Full combat manoeuvres.	do	PO PI SO SI	71 150 150 150	1 	Link ejector bracket in B.F.M. disengaged.	15799	20	No strikes
14.6.52	36	2000 ft. I.A.S. 500 kts.	do	PO PI SO SI	150 150 150 150	 		16399	20	Pylon camera used. No strikes.
17.6.52	37	2000 ft. I.A.S. 525 kts.	do	PO PI SO SI	31 73 150 150	1 1 	Maxiflux lead came out of terminal block. Complete misfeed.	16803	22	3½" fairings fitted to deflectors. 6 strikes found on starb. flap.
17.6.52	38	Full combat manoeuvres.	do	PO PI SO SI	150 150 150 150	 		17403	22	No strikes.
17.6.52	39	2000 ft. I.A.S. 500 knots.	do	PO PI SO SI	150 150 150 150	 		18003	22	No strikes.

18.6.52	40	2000 ft. I.A.S. 530 kts.	H.10673 H.10710 L.7220 H.10505	PO PI SO SI	4 150 150 134	1 1	Complete misfeed Link jam in B.F.M.	18441	24	No strikes.
19.6.52	41	2000 ft. I.A.S. 500 kts.	do	PO PI SO SI	150 150 150 3	 1	 Complete misfeed.	18894	25	No strikes. Pylon camera used.
30.6.52	42	2000 ft. I.A.S. 520 kts.	H.10673 L.7220 H.10505 H.10710	PO PI SO SI	150 150 12 150	 1 	 B.F.M. incorrectly assembled	19356	26	All new B.F.M.s used. Previous H.F.M.s condemned as worn out.
30.6.52	43	2000 ft. I.A.S. 520 kts.	do	PO PI SO SI	150 150 150 150	 	 	19956	26	No strikes.
30.6.52	44	2000 ft. I.A.S. 530 kts.	do	PO PI SO SI	150 78 150 150	 1 	 Misfire 	20484	27	$2\frac{1}{2}$" fairings fitted to deflectors. No strikes.
1.7.52	45	2000 ft. I.A.S. 500 kts.	do	PO PI SO SI	150 150 150 150	 	 	21084	27	No strikes Pylon camera used.
15.7.52	46	2000 ft. I.A.S. 510 kts.	H.10673 H.10710 H.10505 L.7220	PO PI SO SI	150 44 150 150	 1 	 Breach not locked. 	21578	28	Deflectors without fairings.
15.7.52	47	2000 ft. I.A.S. 520 kts.	do	PO PI SO SI	10 20 150 11	1 1 1	Magazine catch pin came out Breach not locked. B.F.M. rack and pinion disengaged.	21769	31	Shortened deflectors, no fairings. 1 strike. Pylon camera used.
16.7.52	48	2000 ft. I.A.S. 500 kts.	H.10673 H.10710 H.10505 L.7220	PO PI SO SI	- 150 150 150	1 	Electrical fault. O.K. on ground. 	22219	32	Shortened deflectors, no fairings. 5 strikes, 1 link in engine bay.
16.7.52	49	2000 ft. I.A.S. 500 kts.	do	PO PI SO SI	- 150 150 150	1 	Maxiflux lead changed 			Shortened deflectors, no fairings. 5 strikes. Pylon camera used.

17.7.52	50	2000 ft. - 1 to + 4 G	H.10673 H.10710 H.10505 L.7220	PO PI SO SI	150 150 150 150			23269	33	2 strikes 2½" fairingsfitted. Pylon camera used.
18.7.52	51	Full combat manoeuvres	do	PO PI SO SI	64 132 150 150	1 1	Misfeed Broken belt	23765	35	2½" fairings. No strikes.
18.7.52	52	2000 ft. I.A.S. 500 kts.	do	PO PI SO SI	11 150 150 150	1	Incorrectly loaded.	24226	36	No deflectors Pylon camera used
21.7.52	53	40,000 ft. IMN. 0.82 to 0.84	M.91 H.11786 J.4506 H.11657	PO PI SO SI	35 38 40 44			24383	36	2½" fairings.
21.7.52	54	40,000 ft. IMN. 0.71	do	PO PI SO SI	45 47 47 45			24567	36	Fired after 45 mins. at height. Ambient temperature - 56°C.
24.7.52	55	40,000 ft. IMN 0.76	do	PO PI SO SI	42 45 42 46			24742	36	Fired after 53 mins. at height. Ambient temperature - 55.5°C
28.7.52	56	40,000 ft. IMN 0.76	do.	PO PI SO SI	41 3 11 17	 1 1 1	 Maxiflux lead failed Slow B.F.M. Maxiflux lead failed.	24818	39	Fired after 50 mins. at height.
30.7.52	57	2000 ft. I.A.S. 500 kts.	do	PO PI SO SI	131 140 127 150			25366	39	2" deflectors fitted. 1 strike. Tip tanks on.
30.7.52	58	2000 ft. I.A.S. 525 kts.	do	PO PI SO SI	150 150 150 150			25966	39	2" deflectors fitted. 5 strikes.
7.8.52	59	'G' conditions	H.10673 H.10710 H.10505 L.7220	PO PI SO SI	150 150 150 150			26566	39	2" deflectors. 1 strike.

12.8.52	60	2000 ft. I.A.S. 500 kts.	H.10673 H.10710 H.10505 L.7220	PO PI SO SI	44 150 - 150	1	Misfire Maxiflux lead out of terminal block.	26910	41	2" deflectors. 1 strike. Pylon camera on.
12.8.52	61	2000 ft. I.A.S. 520 - 530 kts.	do.	PO PI SO SI	150 150 150 150			27510	41	2" deflectors. 6 strikes.
10.9.52	62	40,000 ft. IMN. 0.76	do	PO PI SO SI	138 123 126 122	1	Return spring rod and guide failed.	28019	42	Fired after 45 mins. at height Ambient temperature - 51°C.

/Appendix 3.....

Intensive Flying Trials - Gunnery
Venom FB.1 - WE.259 - Air Firing Records

Appendix 3.

Date	Sortie No.	Flight Data	Gun No.	Gun Pos'n.	Rounds Fired	No. of Stoppages	Stoppages	Progressive Rds. fired.	Total stoppages	Remarks
17.7.52	1	2000 ft. I.A.S. 470 kts.	J.7636	PO	150					
			H.11765	PI	33	1	Misaligned feed chute	483	1	
			J.6462	SO	150					
			H.10898	SI	150					
17.7.52	2	2000 ft. IAS 510 kts.	do	PO	20	1	Maxiflux lead failed.	953	2	
				PI	150					
				SO	150					
				SI	150					
17.7.52	3	2000 ft. IAS 490 kts.	do	PO	150			1467	3	
				PI	150					
				SO	150					
				SI	64	1	Link jam in chute.			
18.7.52	4	2000 ft. IAS 450 kts.	L.7330	PO	150			1937	4	
			J.7474	PI	150					
			J.6538	SO	150					
			H.13007	SI	20	1	Link jam in B.F.M.			
18.7.52	5	2000 ft. IAS 500 kts.	do	PO	150			2407	5	Packing strip coming out of cannon spout fairing. belled out. Mouth of deflector chute/
				PI	150					
				SO	150					
				SI	20	1	Link jam in chute			
18.7.52	6	2000 ft. IAS 480 kts - 500 kts.	do	PO	150			2901	6	
				PI	150					
				SO	44	1	Misaligned round.			
				SI	150					
18.7.52	7	2000 ft. IAS 490 - 500 kts.	do	PO	150			3370	7	P.O. Blast tube - cone damaged. P.I. Cannon spout cracked at fairing.
				PI	150					
				SO	19	1	No extraction			
				SI	150					
18.7.52	8	2000 ft. I.A.S.485 - 490 kts.	do	PO	150			3970	7	
				PI	150					
				SO	150					
				SI	150					
19.7.52	9	Ground attack	J.9528	PO	150			4570	7	
			J.9501	PI	150					
			J.7840	SO	150					
			I.5955	SI.	150					

19.7.52	10	Ground attack	J.9528 J.9015 J.7840 L.5955	PO PI SO SI	150 150 150 150			5170	7	
19.7.52	11	2000 ft. IAS 480 - 490 kts.	do	PO PI SO SI	150 150 150 33	1	Broken firing pin. Incorrectly diagnosed	5653	8	
19.7.52	12	2000 ft. IAS. 500 kts.	do	PO PI SO SI	150 150 150 -	1	Broken firing pin.	6103	9	S.O. Blast tube - cone damaged.
19.7.52	13	2000 ft. IAS. 500 kts.	do	PO PI SO SI	150 150 150 150			6703	9	
19.7.52	14	2000 ft. IAS. 510 kts.	do	PO PI SO SI	150 42 150 150	1	Faulty ejection.	7195	10	P.O. Cannon spout cracked at fairing.
19.7.52	15	2000 ft. IAS. 500 kts.	do	PO PI SO SI	150 150 150 150			7795	10	
20.7.52	16	2000 ft. IAS. 500 kts.	J.7636 J.6462 H.10898 H.11765	PO PI SO SI	150 150 150 150			8395	10	
20.7.52	17	2000 ft. IAS. 500 kts.	do	PO PI SO SI	25 150 150 150	1	Broken sear.	8870	11	
20.7.52	18	2000 ft. IAS 500 kts.	do	PO PI SO SI	150 150 150 55	1	Pin sheared in return spring guide. Return spring rod fractured.	9375	12	New port cannon spout fairing fitted. S.O. Cannon spout cracked at fairing.
25.7.52	19	Ground attack	H.13007 J.7474 J.6538 L.7330	PO PI SO SI	150 150 150 150			9975	12	
25.7.52	20	Ground attack	do	PO PI SO SI	150 150 150 150			10575	12	

25.7.52	21	2000 ft. IAS. 500 kts.	H.13007 J.7474 J.6538 L.7330	PO PI SO SI	150 150 150 150			11175	12	
25.7.52	22	2000 ft. IAS. 500 kts.	do	PO PI SO SI	150 150 150 150			11775	12	P.I. Cannon spout cracked at fairing.
25.7.52	23	Ground attack	do	PO PI SO SI	150 150 150 150			12375	12	
25.7.52	24	2000 ft. IAS. 500 kts.	do	PO PI SO SI	128 150 150 150	1	Link jam in B.F.M. link chute door spring re-set.	12953	13	
25.7.52	25	40,000 ft. IMN 0.82 - 0.84	do	PO PI SO SI	28 150 150 150	1	Short breach block recoil.	13431	14	
28.7.52	26	2000 ft. IAS 500 kts.	J.6462 H.10898 J.7636 H.11765	PO PI SO SI	150 150 150 150			14031	14	
28.7.52	27	2000 ft. IAS 500 kts.	do	PO PI SO SI	15 150 150 150	1	Light strike.	14496	15	Starb. cannon spout fairing split at rear of outer spout. New fairing fitted.
28.7.52	28	2000 ft. IAS 500 kts.	do	PO PI SO SI	150 150 150 150			15096	15	
28.7.52	29	40,000 ft. IMN. 0.83 - 0.81	do	PO PI SO SI	- 150 - 150	1 1 	Maxiflux lead shorted and blew fuse to outer guns.	15396	16	
29.7.52	30	2000 ft. I.A.S. 500 kts	J.9528 J.7840 J.9015 L.5955	PO PI SO SI	150 - 150 -	 1 1	Maxiflux lead shorted and blew fuse to inner guns.	15696	17	

29.7.52	31	2000 ft. IAS 500 kts.	J.9528 J.7840 J.9015 L.5955	PO PI SO SI	150 150 150 150			16296	17	S.I. Cannon spout slightly cracked at fairing.
29.7.52	32	2000 ft. IAS 500 kts.	do	PO PI SO SI	150 150 150 20	1	Faulty maxiflux lead.	16766	18	P.O. empty case chute, rearface failed in bearing at both rivetted joints.

/Appendix 4.....

Appendix 4

Venom W.F.258.

Flight at High Mach No.

1. Introduction

This report covers three flights on Venom W.F.258 carried out on July 22nd and 23rd. The second and third flights were as a result of certain Mach No. characteristics exhibited by the aircraft during the first sortie which involved firing the guns at high Mach No. high altitude.

2. Conditions of Aircraft

1st Flight	Load Clearance No. 5. Aircraft clean, 600 rounds of ammunition.
2nd Flight	Load Clearance No. 5. Minus link ejector chutes.
3rd Flight	Load Clearance No. 5. Minus link ejector chutes: aircraft fitted with new elevator spring tab.

3. Results of Test.

1st Flight: (High Mach. No. high altitude firing)

At 42,000 feet the aircraft was put into a shallow dive at a power setting of 10,100 revs. The aircraft was trimmed at Mach. No. 0.80.

At Mach. No. 0.82 there was a slight nose down change of trim. At this Mach No. the pilot fired a short 2 second burst without any noticeable effect upon the handling of the aircraft. At Mach. No. 0.83 there was a slight lateral rocking due to alternate wing heaviness. Another short burst was fired without any particular effect. At Mach. No. 0.835 the aircraft began a fairly strong nose up change in trim requiring almost full forward movement of the stick to hold. Two more bursts were fired in this condition without any noticeable effects upon the aircraft. On this run a peak Mach. No. of 0.84 was achieved when the aircraft nosed up so strongly that the pilot was unable to hold the dive with the stick fully forward.

There was no evidence that the firing of the guns caused any change in the Mach No. characteristics but the pilot did several runs at high Mach No. between 42,000 - 38,000 feet to verify the constant behaviour of the aircraft. In each case the aircraft behaved in the same way.

Mach No.	0.80	- Aircraft in trim
	0.82	- Slight nose down
	0.83	- Lateral rocking
	0.835	- Moderately strong nose up with the onset of elevator buffeting and elevator ineffectiveness.
	0.84	- Strong nose up, elevator only partly effective. Stick fully forward and the nose still rising. Pronounced elevator buffeting.

The strong nose up at Mach No. 0.84 depended upon how quickly the Mach. No. was increased. Thus in the steeper dive the nose up with the stick fully forward induced an accelerometer reading in the region of $1\frac{1}{2}$ - 2 'g' indicated.

Two runs were made at approximately 33,000 feet. The aircraft reacted in much the same way except that the nose up was not so pronounced. There was less buffeting of the elevator which was more effective.

2nd Flight. (Link ejector chutes removed).

The link chutes were removed in order to check whether they were the cause of the characteristics exhibited on the previous test.

/The tests...

The tests were repeated but there was no change in the Mach. No. characteristics.

3rd Flight. (New elevator spring tab).

After the previous flight it was noticed that there was a small amount of play in the elevator spring tab arm. The tab was removed and a new one fitted.

In this condition the previous tests were repeated.

There was no change in the strong nose up at Mach No. 0.84, but this was now combined with a strong right wing down which the pilot was unable to hold due to the ailerons becoming insufficiently effective.

The pilot considered that although the elevator lost effectiveness to the same extent as on the previous flight there was now less elevator buffeting.

Four runs were made between 42,000 - 38,000 feet withconsistent results. The recovery of the aircraft from the right wing down position was automatic as the tendency disappeared as soon as the nose had risen sufficiently for the Mach. No. to reduce.

Two runs were made at 33,000 feet and although the nose up was as before this was now accompanied by a right wing drop.

4. Conclusions

Neither the gun firing or the link chutes affect the Mach No. characteristics of the aircraft.

The change in characteristics at high Mach No. appear to be caused by a general deterioration in finish.

/Appendix 5..

APPENDIX 5.

VENOM F.B.I.

50 YARD DIAGRAM FOR SPREAD HARMONISATION AT 500 YARDS. OPERATIONAL USE

HARMONISATION CONDITIONS.

1. GUNNERY.

A.	AIRSPEED:	250 KTS. I.A.S.
B.	TRUE ALTITUDE:	25,000 FT.
C.	AMMUNITION:	H.E./I. MK.I.
D.	GRAVITY DROP:	4·8 FT.

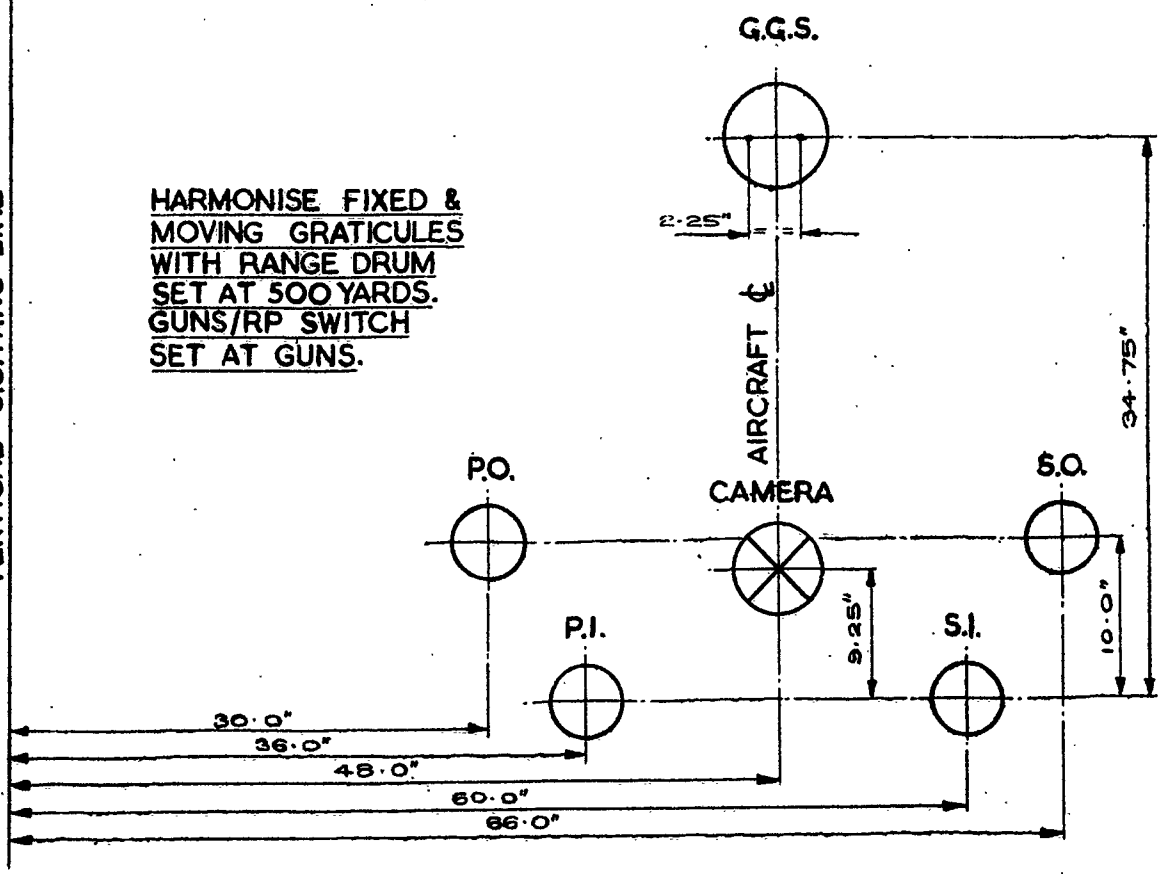
2. ROCKETRY.

A.	AIRSPEED:	445 KTS. I.A.S.
B.	DIVE ANGLE:	30°.
C.	RELEASE RANGE:	800 YDS.

SK.№A.3530 | 10½ PART OF REPORT №A&A.E.E./868 | TR.S.S. | CH. A.T. BEASLEY. | APP. K.E.H. for Sof A | 24.4.52.

VENOM F.B.I.

50 YARD DIAGRAM FOR SPREAD HARMONISATION AT 500 YARDS (OPERATIONAL USE)



SET AIRCRAFT DATUM 1° TAIL DOWN FROM HORIZONTAL.

SET PORT INNER GUN 0°30' UP FROM HORIZONTAL.

R.P. SIGHT SETTINGS.

G.G.S. MK. 4E. CLASS 2.

60 LB. & 25 LB. HEADS SET RANGE DRUM 'M' TO 240 YARDS.

Appendix 6.

Gun Rates of Fire and Brief History

Date:- 3.4.52.

Flight Data:- Height 1,000 ft. I.A.S. 535 - 515 knots. Level flight.

Gun Position:-		P.O.	P.I.	S.I.	S.O.
Gun Number:-		H11657	J4506	H11786	L3363
Burst:-	1	507	492	455	527
	2	512	495	458	531
	3	537	533	(Stoppage)	557
	4	470	470	"	460
	5	507	507	"	506
	6	537	507	"	543
	7	495	468	"	503
	8	534	520	"	528
	9	503	493	"	524
	10	503	500	"	516

Date:- 10.9.52

Flight Data:- Height 40,000 ft. I.M.N. 0.76 Level flight. Fired after 45 minutes at Height. Ambient temperature - 51°C.

Gun Position:-		P.O.	P.I.	S.I.	S.O.
Gun Number:-		H10673	H10710	H10505	L7220
Burst:-	1	760	658	718	682
	2	785	687	753	688
	3	798	684	725	695
	4	805	682	745	694

H11657 - Brief History - (Aircraft WE.258)

	Date	Total Rds. Fired	R.O.F.	Remarks
Received at A. & A.E.E.	23.1.51	124	-	Prior to acceptance test.
First tested at A. & A.E.E.	-	-	-	
Passed acceptance test	-	-	-	
Installed in subject aircraft.	3.4.52	1616	-	
Air Firing R.O.F. tests.	3.4.52	1766	510	
Removed from subject aircraft.	31.7.52	3710	-	

Stoppages:
B.F.M. - 1 Electrical - 1 Total 2
Rounds fired 1904

J.4506 - Brief History - (Aircraft WE.258)

	Date	Total Rds. Fired	R.O.F.	Remarks
Received at A. & A.E.E.	22.1.52	368	-	-
First tested at A. & A.E.E.	28.1.52	468	-	-
Passed Acceptance test.	31.3.52	1268	675	Mk.7. B.F.M.
Installed in subject aircraft.	3.4.52	1368	-	-
Air firing R.O.F. test.	3.4.52	1468	498	-
Removed from subject aircraft.	31.7.52	3570	-	-

Stoppages:
B.F.M. - 2 Total 2
Rounds fired. 1902

H.11786 - Brief History - (Aircraft WE.258)

	Date	Total Rds. fired	R.O.F.	Remarks
Received at A. & A.E.E.	1.7.49	-	-	Previous history
first tested at A. & A.E.E.	24.1.50	100	-	unknown.
Passed acceptance test.	-	-	-	
Installed in subject aircraft.	3.4.52	3487	-	
Air firing R.O.F. test.	3.4.52	3497	457	Stoppage
Removed from subject aircraft.	3.4.52	4732	-	

Stoppages:
Gun - 3 B.F.M. - 1 Electrical - 2 Total 6
Rounds fired. 1033

L3363 - Brief history - (Aircraft WE.258)

	Date	Total Rds. fired	R.O.F.	Remarks
Received at A. & A.E.E.	6.11.50	15	-	-
First tested at A. & A.E.E.	17.9.50	115	-	-
Passed acceptance test.	20.9.50	565	670	Mk.7 B.F.M.
Installed in subject aircraft	3.4.52	1315	-	-
Air firing R.O.F. tests.	3.4.52	1465	519	-
Removed from subject aircraft.	17.6.52	3281	-	-

Stoppages:
Misfired - 1 Total 1
Rounds fired. 1666

H.10673 - Brief History - (Aircraft WE.258)

	Date	Total Rds. fired	R.O.F.	Remarks
Received at A. & A.E.E.	3.2.51	83	-	-
First tested at A. & A.E.E.	23.2.51	123	-	Prior to accep-
Passed acceptance test.	-	-	-	tance test.
Installed in subject aircraft	27.3.52.	1899	-	-
Air firing R.O.F. test	10.9.52	6068	787	-
Removed from subject aircraft.	11.9.52	6206	-	-

Note: The very high rate of fire of this gun was subsequently reduced to 735 by the fitting of a strong F.M.U. spring, and further reduced to 690 by using a No.53 hole in gas plug.

Stoppages:
Installation - 1 Electrical - 3 B.F.M. - 4 Maintenance - 1
Ammunition - 1 Gun breakage - 1 Total 11
Rounds fired. 4007

H10710 - Brief history - (Aircraft WE.258)

	Date	Total Rds. fired.	R.O.F.	Remarks
Received at A. & A.E.E.	3.2.51	91	-	
First tested at A. & A.E.E.	23.2.51	191	-	Prior to accep-
Passed acceptance test.	-	-	-	tance test.
Installed in subject aircraft.	27.3.52	2142	-	
Air firing R.O.F. test.	10.9.52	7115	677	
Removed from subject aircraft.	-	7237	-	Still in aircraft

Stoppages: Installation - 1 Electrical - 1 Gun functioning - 2
Broken belt - 1 Total 5
Rounds fired. 5095

H.10505 - Brief history - (Aircraft WE.258).

	Date	Total Rds. fired.	R.O.F.	Remarks
Received at A. & A.E.E.	3.2.51	82	-	-
First tested at A. & A.E.E.	23.2.51	102	-	Prior to acceptance test.
Passed acceptance test.	-	-	-	
Installed in subject aircraft.	27.3.52.	3457	-	-
Air firing R.O.F. test.	10.9.51	8220	721	-
Removed from subject aircraft.	-	8346	-	Still in A/C.

Stoppages:

Installation - 1 B.F.M. - 3 Maintenance - 1
Electrical - 1 Gun breakage - 1 Total 7
Rounds fired. 4889

L7220 - Brief history - (Aircraft WE.258)

	Date	Total Rds. fired	R.O.F.	Remarks
Received at A. & A.E.E.	3.2.51.	87	-	-
First tested at A. & A.E.E.	23.2.51.	187	-	Prior to acceptance test.
Passed acceptance test.	-	-	-	
Installed in subject aircraft.	27.3.52.	3361	-	-
Air firing R.O.F. test.	10.9.52	7265	690	-
Removed from subject aircraft.	-	7398	-	Still in A/C.

Stoppages:

Installation - 1 Electrical - 1 Gun breakage - 1
Ammunition - 1 Maintenance - 1 Total 5
Rounds fired. 4037

/Appendix 7.....

Type No.	Description	Figure	Speed Range I.A.S.	No. of sorties	Results	Reasons for ejection.
1	Deflectors with open front and partly streamlined deflector behind ejection opening. No reduction of ejection opening. Designed by De Havilland Aircraft Co.	12	450 knots.	1	Stoppages due to link jams in deflectors and chutes.	Links piled up in deflectors
2	3½" high in front with 20° slope to skin of fuselage at rear. No reduction of ejection opening. Locally designed.	13	460-530 kts. 'G' conditions and full combat manoeuvres	10	Average of 1% link strikes per sortie.	Effect on performance unacceptable.
3	Type No. 1 modified by fitting a sloping plate to front of deflector as in fig. 12. Rear of deflector unmodified. ¼" gap between plate and A/C skin.	12 & 14	500 knots.	1	42 Link strikes.	Too many link strikes.
4.	As for type No. 3 but with rear of deflector boat-shaped.	14	500 knots.	1	21 link strikes.	Too many link strikes.
5.	Extension link chutes fitted to gun access doors to reduce size of ejection opening to that of link chute. 4½" streamlined deflectors. Designed by D. H. Aircraft Co.	15 & 16	500-530 kts. 'G' conditions and full combat manoeuvres.	8	1 link strike in 8 sorties. Inner ends of extension link chutes required belling out to allow for adjustment of B.F.M.s.	Deflectors found by subsequent trials to be larger than necessary Link chutes may foul extension chutes after a gun change or harmonisation.
6	As for type 5 but with 3½" deflectors	15 & 16	500-530 kts. 'G' conditions and full combat manoeuvres.	7	4 link strikes in 7 sorties. 6 strikes on starboard flap after 1st sortie may have been from a previous sortie.	As for type No. 5.
7	As for type 5 but with 2½" deflectors	17	500-530 kts. 'G' conditions & full combat manoeuvres.	5	2 link strikes in 5 sorties.	Deflector accepted.
8	As for type 5 but with inner end of extension link chute belled out and with 2" deflector.	18	500-530 kts. & 'G' conditions	5	5 - 6 link strikes per sortie at 520 knots. I.A.S. and over.	Deflector rejected, too many link strikes. Extension link chute accepted.
9	Extension link chute as in type No. 8 with 2½" deflector as in type No. 7.	17 & 18	-	-	-	Accepted.

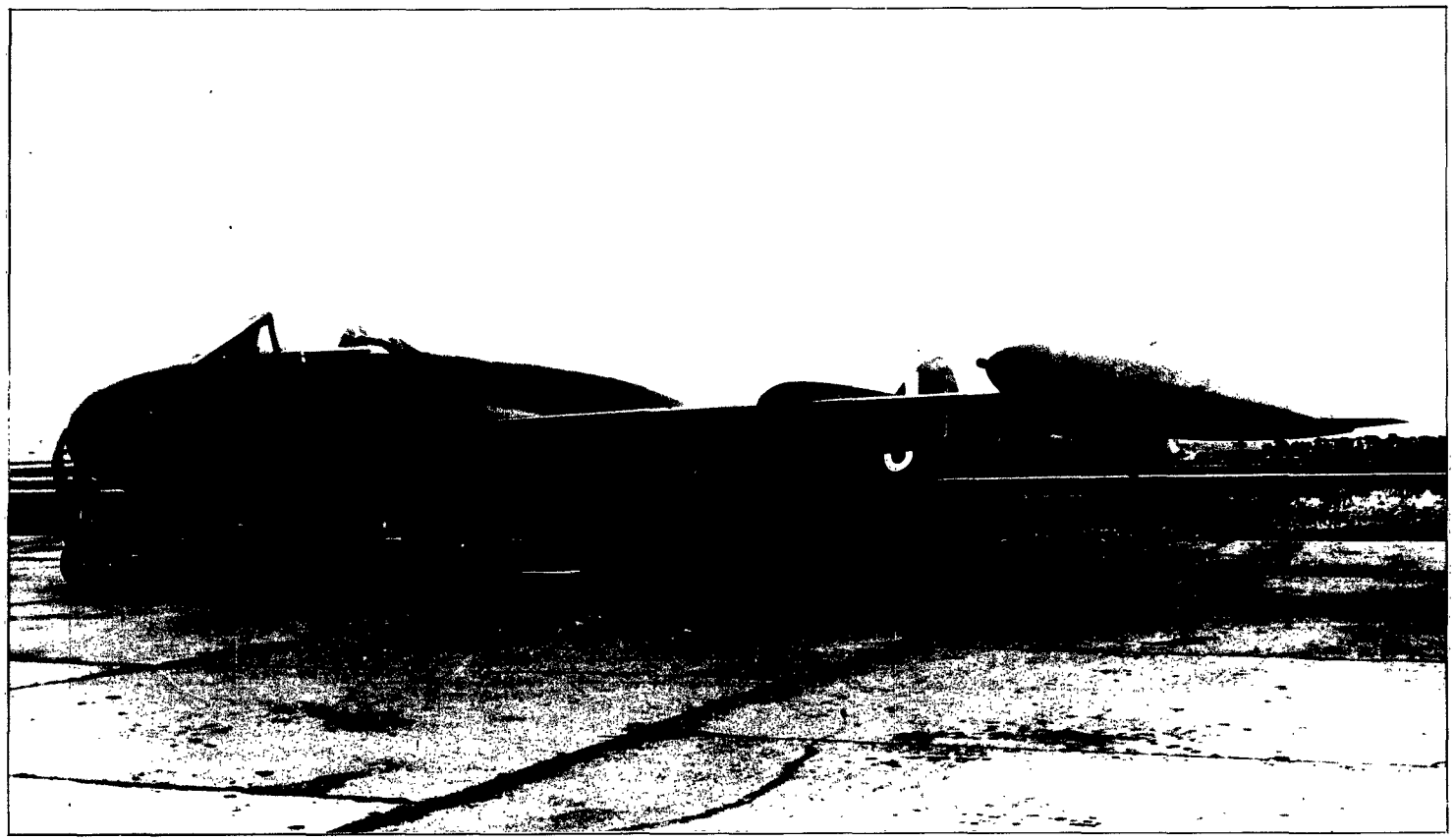


FIG. 1. THREE-QUARTER FRONT VIEW OF AIRCRAFT.

FIG. 2. EXTERNAL CRACKS ON FAIRING PANEL AT FORWARD APERTURE FOR NOSE WHEEL DOOR HINGE.

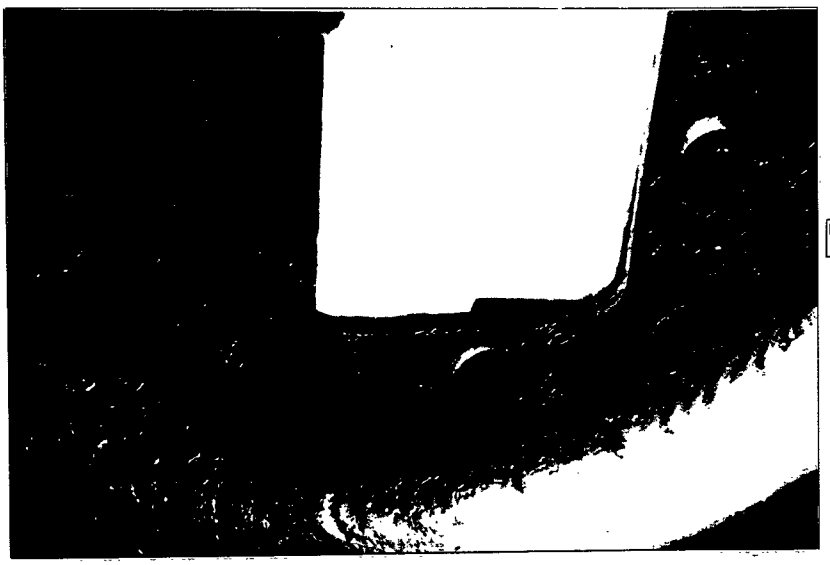


FIG. 3. INTERNAL CRACK AS AT FIG. 2.

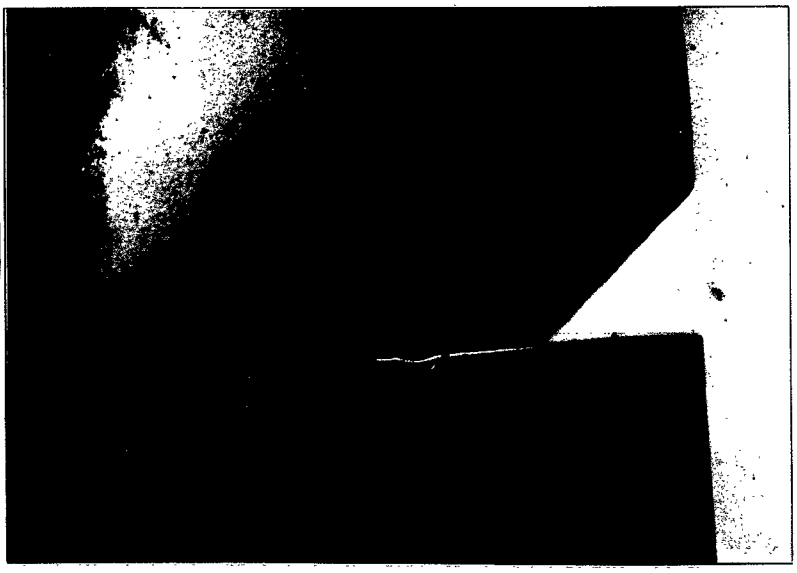


FIG. 4. CRACK ON FAIRING AT APERTURE FOR REAR HINGE.

A. & A.E.E. NEG. Nº 15868.

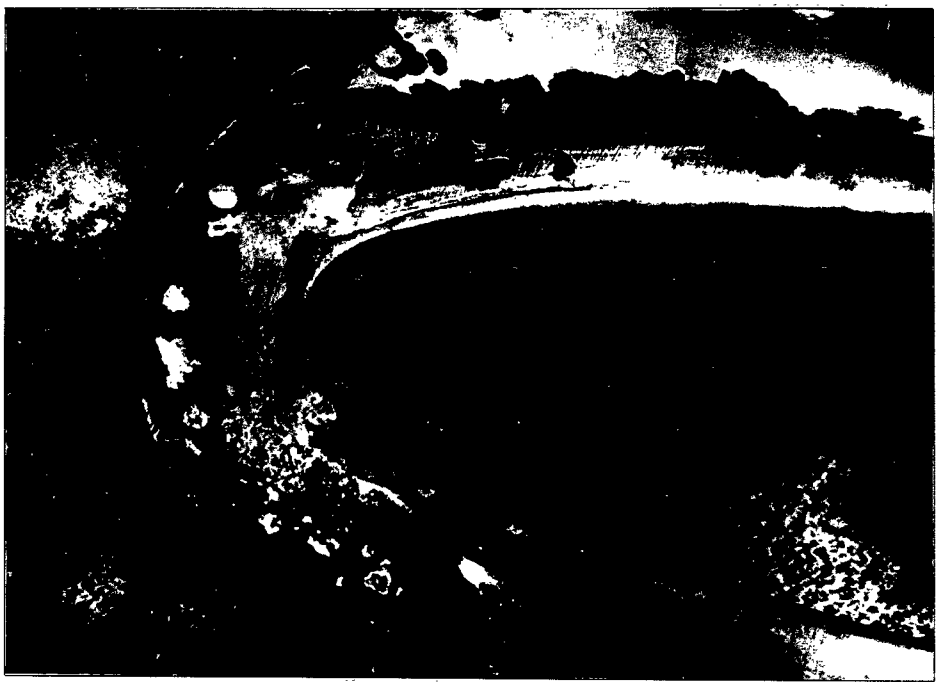


FIG. 5. CANNON SPOUT - CRACKED LIP.

FIG. 6. DAMAGE TO PACKING STRIP OF CANNON SPOUT FAIRING.

A. & A.E.E. NEG. Nº 15868.

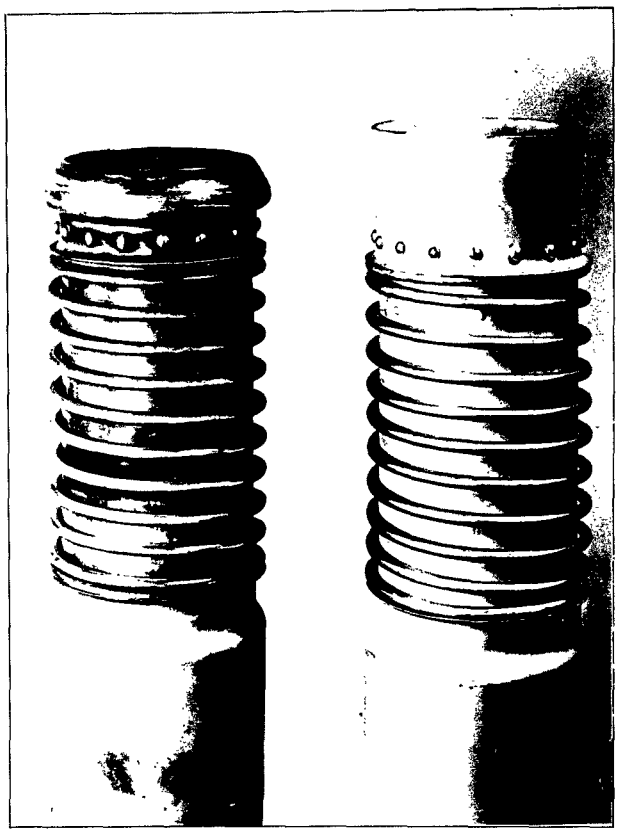


FIG. 7 STANDARD AND MODIFIED BLAST TUBE

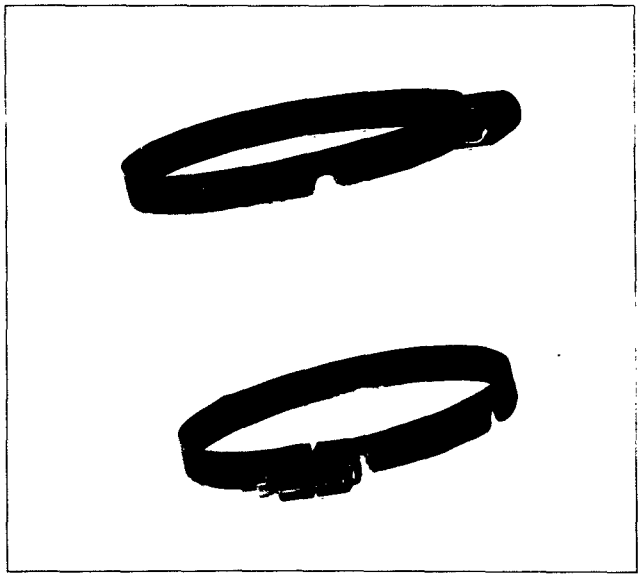


FIG. 8 SUGGESTED TYPE OF MODIFIED BLAST TUBE SECURING CLIP

A. & A.E.E. NEG. Nº 15868.

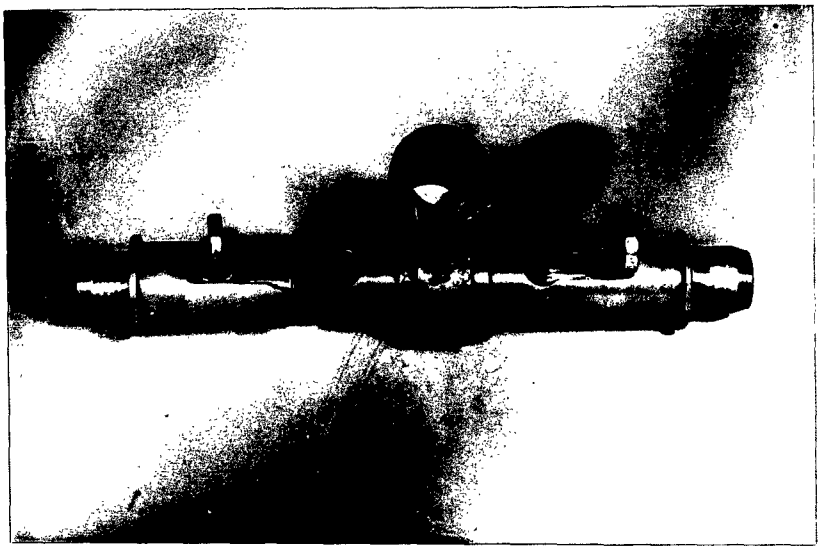


FIG. 9. FRACTURED QUICK RELEASE ASSEMBLY AT REAR MOUNTING.

FIG. 10. FAILURE OF RETURN SPRING GUIDE AND ROD, S.I. GUN, SHOWING POSITION RELATIVE TO MAIN FUEL PIPE.

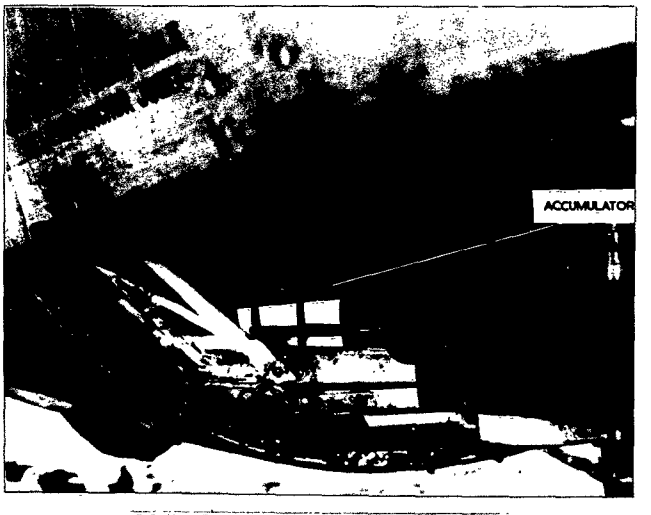


FIG 11. FAILURE OF RETURN SPRING GUIDE AND ROD, S.O. GUN, SHOWING POSITION RELATIVE TO ACCUMULATOR

A. & A.E.E. NEG. Nº 15868.

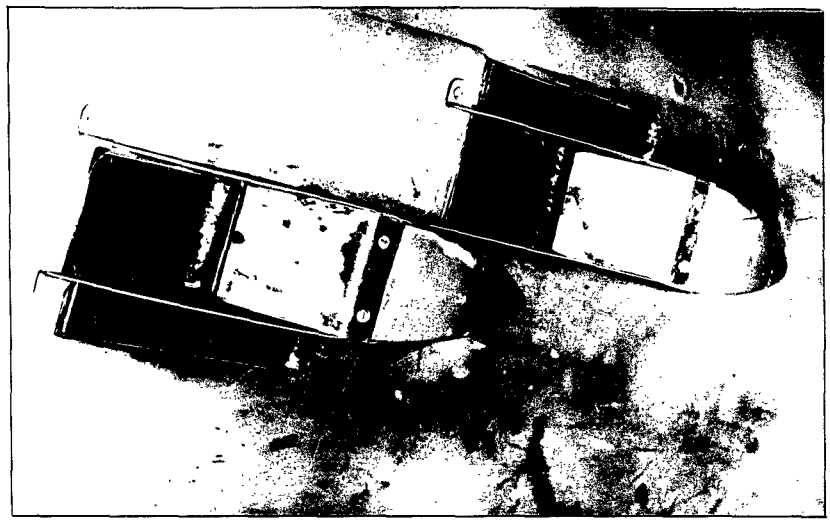


FIG. 12. ORIGINAL D.H. DEFLECTOR.

FIG. 13. LOCALLY DESIGNED DEFLECTOR.

FIG. 14 MODIFIED D.H. DEFLECTOR.

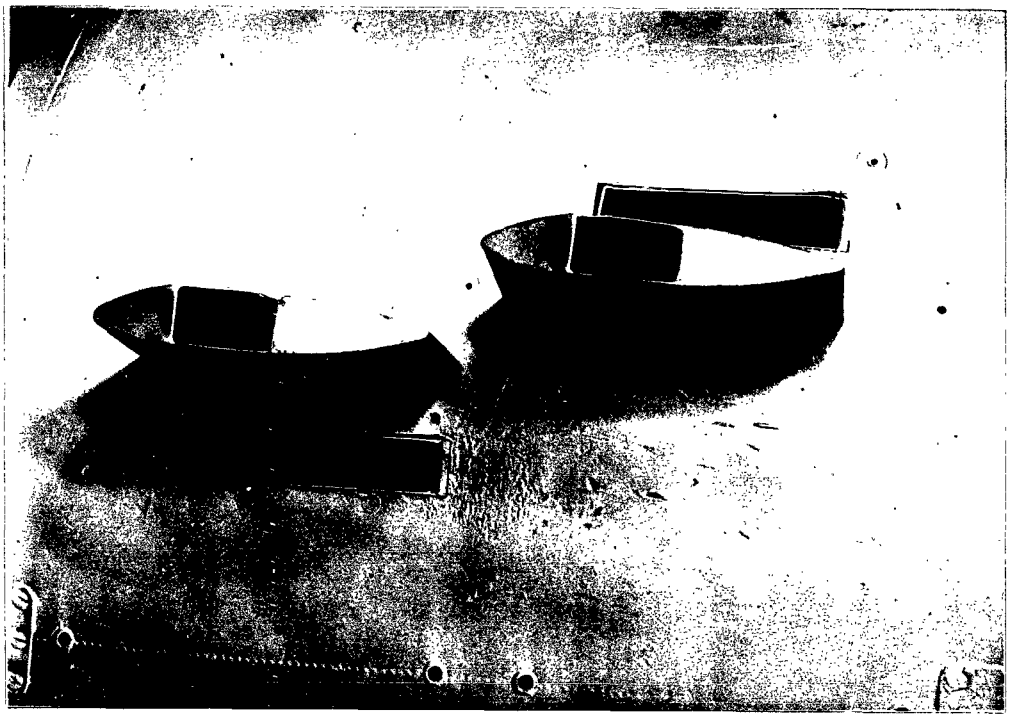


FIG. 15. REDESIGNED D.H. DEFLECTOR.
EXTERNAL VIEW.

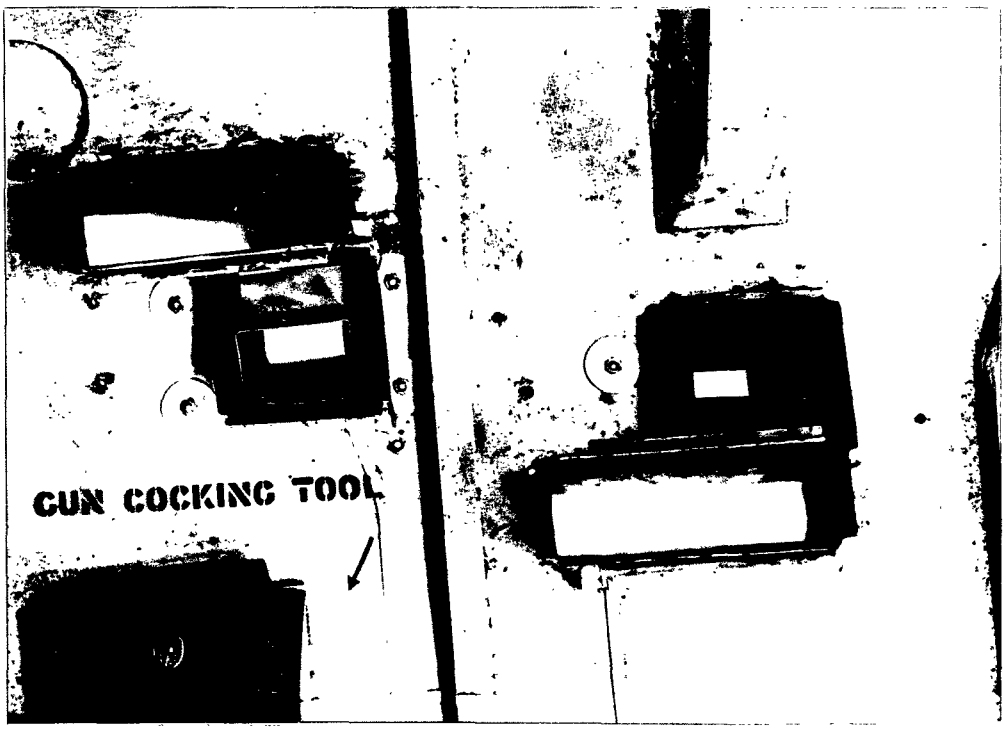


FIG. 16. REDESIGNED D.H. DEFLECTOR.
INTERNAL VIEW.

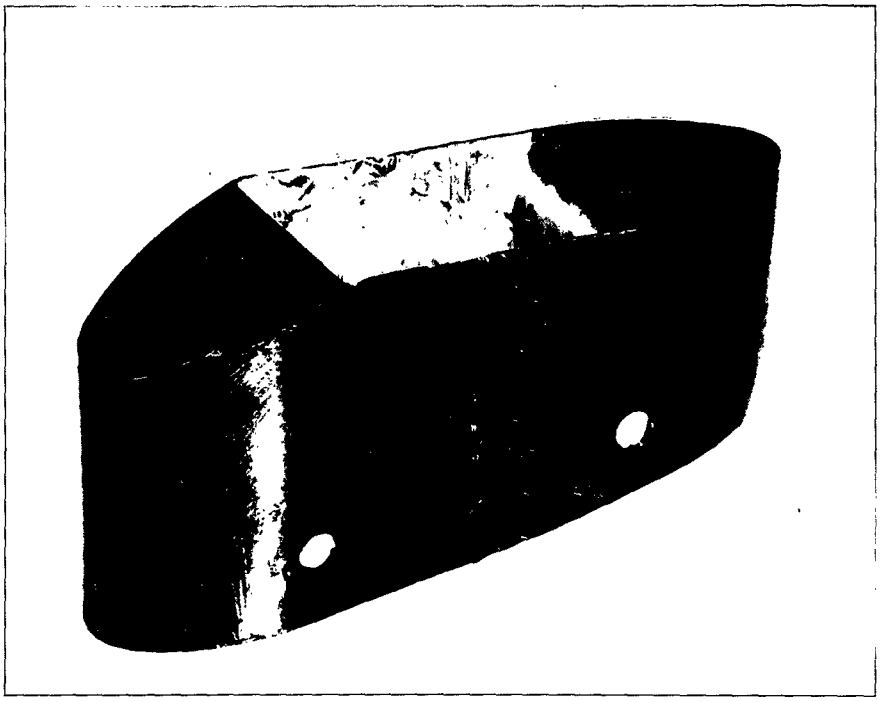


FIG. 17. 2½ FAIRING FOR LINK DEFLECTOR.
NOTE: INTERNAL SURFACES PAINTED WHITE FOR ILLUSTRATION ONLY.

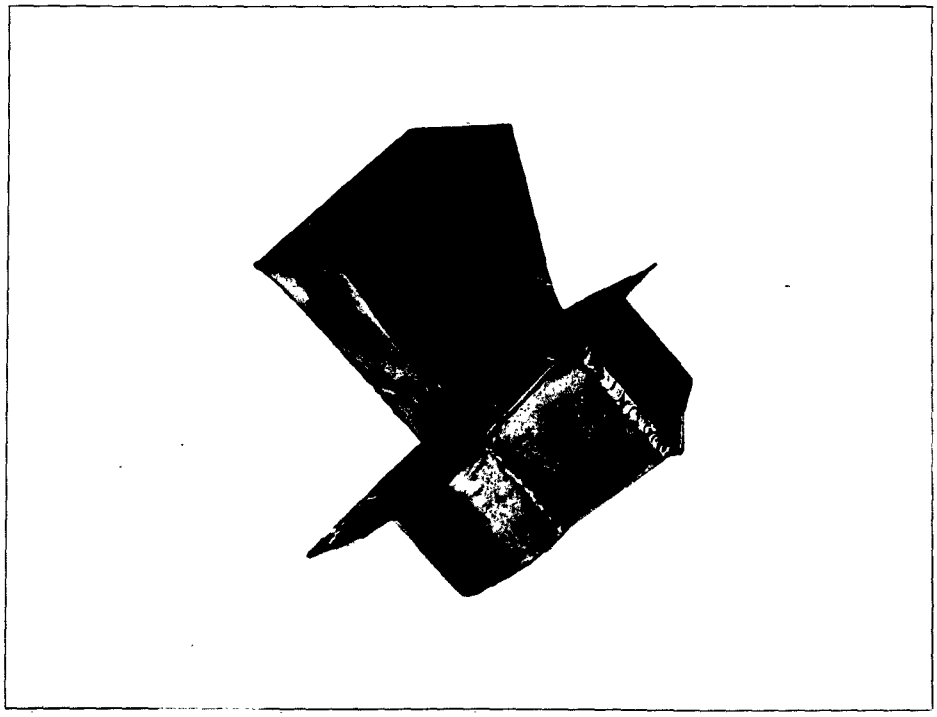


FIG. 18. FINAL INTERNAL FORM OF DEFLECTOR FITTED WITH 2" FAIRING.

A. & A.E.E. NEG. Nº 15868.

LINK FLOW

FIG. 19. 4·5"DEFLECTORS.

FIG. 20. 3·5" DEFLECTORS

I.A.S. 500KTS.

A&AEE NEG. No 15876

LINK FLOW.

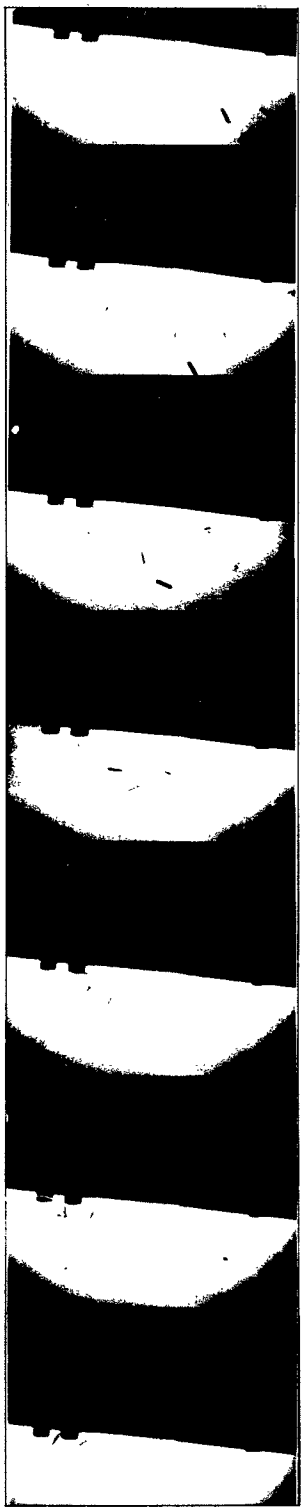


FIG. 21. 2·5° DEFLECTORS.

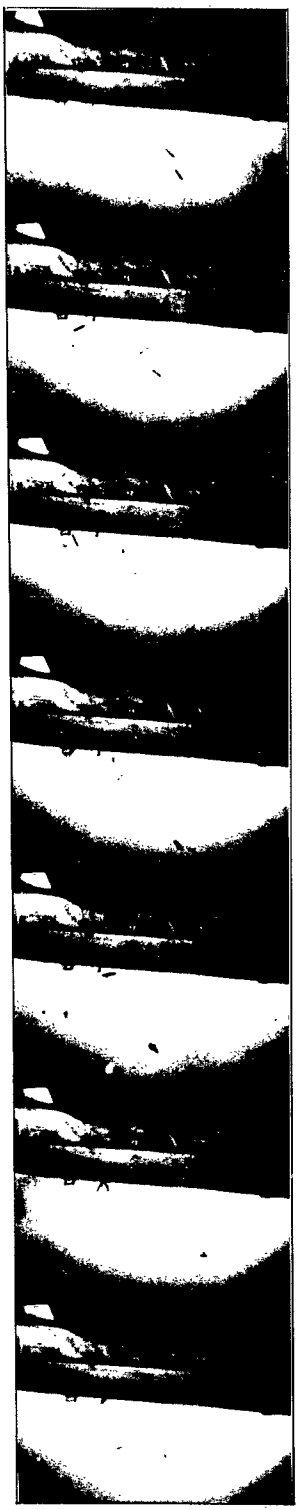


FIG. 22. 2" DEFLECTORS.

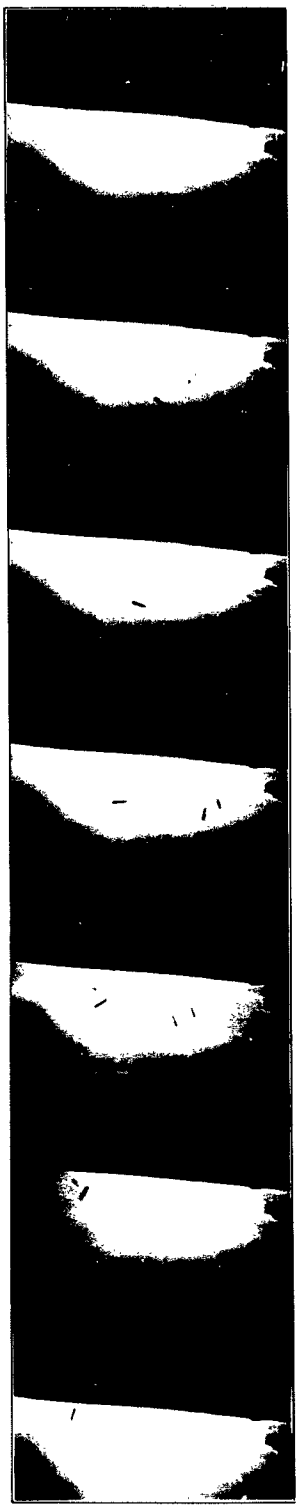


FIG. 23. NO DEFLECTORS

I.A.S. 500KTS.

[dstl]

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Date of Search: 3 March 2009

Record Summary: AVIA 18/4004
Title: Venom FB 1 WE.258 (Ghost 3): 4 x 20 mm Mk 5* Hispano Guns; Gunnery Acceptance Trials
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Former reference (Department) 868 Pt 10
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